

## ABSTRACT

A superconducting transformer may include two pairs of axially extending windings. The windings are each in the form of a right cylindrical solenoid having a circular cross-section which are substantially concentrically nested. Each winding  
5 includes a plurality of turns formed from superconducting tape. Each winding respectively includes a first end and a second end which are configured for electrical connection with at least one of the other ends, an alternating power source, a load, or other passive or active electrical components. The transformer includes a first axially extending primary winding corresponding to the outermost winding and a first axially  
10 extending secondary winding nested within the first primary winding. A second axially extending primary winding is nested within the first secondary winding. A second axially extending secondary winding is nested within the second primary winding such that the second secondary winding corresponds to the innermost winding. The transformer further includes three predetermined gaps which define the radial separation  
15 of the nested windings. A predetermined core gap defines the diameter of the second secondary, or innermost, winding.